

REMARKS/ARGUMENTS

Re-examination and favorable reconsideration in light of the above amendments and the following comments are respectfully requested.

Claims 1 - 11 and 24 - 28 are pending in the application. Currently, no claim stands allowed.

By the present amendment, claim 1 has been amended to include the subject matter of now cancelled claims 2 and 3.

In the office action mailed October 17, 2005, claims 1, 2, and 5 were rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,366,695 to Erickson in view of U.S. Patent No. 4,302,256 to Kenton; and claims 3, 4, 6 - 11 and 24 - 28 were rejected under 35 U.S.C. 103(a) as being unpatentable over Erickson in view of Kenton and further in view of U.S. Patent No. 5,605,584 to DeLuca et al.

The foregoing rejections are traversed by the instant response.

The present invention broadly relates to a nickel base superalloy having a composition of from 3.0 to 12 wt% chromium, up to 3.0 wt% molybdenum, 3.0 to 10 wt% tungsten, less than 5.0 wt% rhenium, 6.0 to 12 wt% tantalum, 4.0 to 7.0 wt% aluminum, up to 15 wt% cobalt, up to 0.05 wt% carbon, up to 0.02 wt% boron, up to 0.1 wt% zirconium, up to 0.8 wt% hafnium, up to 2.0 wt% niobium, up to 1.0 wt% vanadium, up to 0.7 wt% titanium, up to 10 wt% of at least one element selected from the group consisting of ruthenium, rhodium, palladium, osmium, iridium, platinum, and mixtures thereof, and the balance essentially nickel. The nickel base superalloy also has a microstructure which is pore free and eutectic  $\gamma$ - $\gamma'$  free. The microstructure has a gamma prime morphology which includes a bimodal  $\gamma'$  distribution having a uniform distribution of large  $\gamma'$  particles

in a continuous gamma matrix and a second and uniform distribution of fine  $\gamma'$  particles within the matrix.

The rejection of claims 1, 2, and 5 on obviousness grounds over the combination of the Erickson and Kenton patents of record is now moot in view of the amendments to claim 1.

With regard to the obviousness rejection based upon the combination of the Erickson, Kenton, and DeLuca patents of record, this rejection is fatally flawed for a number of reasons. As noted in the Examiner's comments, Erickson teaches an alloy composition which includes from about 5.0 to 7.0 wt% rhenium (see Abstract and claims 1 and 16) or about 5.5 to 6.5 wt% rhenium (see claims 12 and 28). Nowhere does Erickson teach or suggest a composition having less than 5.0 wt% rhenium. Thus, Erickson does not teach or suggest the composition set forth in independent claims 1 and 4. The Kenton and DeLuca patents relied upon by the Examiner does not cure the compositional deficiency of Erickson. Thus, for this reason alone, claims 1 and 4 are allowable over the proposed combination of references.

With regard to the Examiner's analysis of the Erickson patent, Erickson never says what is meant by the word "about". Thus, one can not properly rely on vague language in a reference as an affirmative teaching of a claim limitation. It is submitted that the interpretation being applied by the Examiner is the Examiner's interpretation of Erickson's claim language, which is not necessarily how one of ordinary skill in the art would view Erickson's teachings. As much as the Examiner wants to say that "about 5.0%" covers "less than 5.0%", this vague language could just as easily mean "5.1%". In fact, a fair reading of the preferred ranges in Erickson would lead one of ordinary skill in the art to conclude that Erickson teaches away

from the claimed invention of having a composition with less than 5% rhenium.

The rejection is further defective in that Erickson does not teach one of ordinary skill in the art how to make and use an alloy of the above composition that is pore free. The Examiner attempts to overcome this deficiency by applying the Kenton patent. However, Kenton does not teach one how to form an alloy with the claimed composition that is pore free. As noted by the Examiner, Kenton teaches a HIP method which improves mechanical properties of alloys including the "substantially complete removal of defects such as micropores." Applicants again submit that this is not a teaching of how to make an alloy which has a pore-free microstructure. The fact that Kenton uses the terminology "substantially complete removal" instead of "complete removal" shows that alloys processed by the Kenton process do not have a pore-free microstructure.

In fact, neither Kenton nor Erickson express any desire to have a microstructure which is pore free. Since Kenton does not accomplish a pore-free microstructure, there is nothing which would motivate one of ordinary skill in the art to combine it with Erickson in the manner suggested by the Examiner. The motivation statement by the Examiner is wrong in that while Kenton may remove casting defects such as pores, it does not remove them in their entirety - hence, no pore-free microstructure.

Further, neither of these cited and applied references teaches or suggests how to form an alloy which is eutectic  $\gamma$ - $\gamma'$  free. The Examiner's reliance on the desire of Erickson to fully solutionize the gamma prime phase as inherently meaning that the alloy is eutectic  $\gamma$ - $\gamma'$  free is misplaced. In order to dissolve the eutectic  $\gamma'$  phase, special heat treatments are required.

Neither Erickson nor Kenton disclose such heat treatments. It should be recognized by the Examiner that there is a cooling  $\gamma'$  phase which can be solutionized and later precipitated out. Since Erickson does not disclose a set of heat treatments for solutionizing out the eutectic  $\gamma'$  phase, it can not be said that it follows that the solutionizing performed by Erickson creates a microstructure which is eutectic  $\gamma$ - $\gamma'$  free. For all anyone knows, Erickson is dealing with the cooling  $\gamma'$  phase. Thus, the Examiner's inherency argument fails. If the Examiner is going to rely on this inherency argument, then the Examiner must point out exactly where Erickson discloses the heat treatments capable of dissolving the eutectic  $\gamma'$  phase.

Assuming arguendo that the Examiner is correct and that fully solutionizing a composition would create the claimed eutectic  $\gamma$  -  $\gamma'$  free microstructure, one of ordinary skill in the art reading Erickson would be led to believe that one has to use a chromium content less than the claimed 3%. A review of the fully solutionized compositions in Erickson (only those claiming 100% solutionization) show that composition 10E has 2.2% Cr; composition 10Gb has 2.3% Cr; composition 10I has 2.6% chromium; composition 12Ca has 2.5% Cr; and composition 12Ri has 2.65% Cr. These are the only compositions which were fully solutionized (the language "99.5 - 100" is believed to mean something less than 100% solutionization). Thus, it is Applicants' belief that Erickson teaches away from the  $\gamma$  -  $\gamma'$  free microstructure of the claimed invention.

With regard to the DeLuca et al. patent, it does not cure the above-noted deficiencies of Erickson and Kenton. Still further, DeLuca relates to the treatment of alloys which do not contain rhenium and also relates to the formation of a trimodal  $\gamma'$  distribution. It is submitted that claims 1, 4, 6, 10, and 24

are allowable because none of the references teach or suggest how to form an object or an alloy having a microstructure which is pore free, eutectic  $\gamma$ - $\gamma'$  free, and a gamma prime morphology which is bi-modal. It is further submitted that none of the cited and applied references teach or suggest forming large  $\gamma'$  particles which are octet shaped in combination with fine  $\gamma'$  particles which are cuboidal in shape. On this point, it should be noted that lines 44 and 45 in column 3 of the DeLuca patent does not mean that the particles are octet shaped. An octet shape has eight sides. A particle with four branches could have more than eight sides or facets. For example, a four branch particle could have twelve sides or facets depending on the shape of the particle.

Regarding claim 5, this claim is allowable for the same reasons as claim 1, as well as the fact that none of the cited and applied references teaches or suggests a microstructure which is pore free, eutectic  $\gamma$ - $\gamma'$  free, bimodal and/or single crystal.

Claims 27 and 28 are allowable for the same reasons as claim 1 and further because none of the cited and applied references teach or suggest how to form a microstructure having the claimed impeding means. Certainly, it is not anything of interest to Erickson and/or Kenton et al.

The remaining claims in the application are allowable for the same reasons as their parent claims as well as on their own accord.

With regard to the Examiner's comments in paragraph 5a of the office action, the Examiner is directed to Applicants' previous comments about the deficiencies of the Erickson patent.

With regard to the Examiner's comments in paragraph 5b of the office action, the Examiner misses the point that Kenton is

not similar in composition and in microstructure to what is being claimed. The Examiner is merely using Kenton to show a particular processing feature. Thus, one of ordinary skill in the art would have no expectation that the Kenton process would arrive at the claimed microstructure which is pore-free. The citation of *In re Best* is duly noted, but this case is inapplicable because the claimed product is not identical or substantially identical to either the product in Erickson or in Kenton.

With regard to the Examiner's comments in paragraph 5c, the Examiner has still not addressed the absence of the required heat treatments in Erickson which would lead to the alloy being eutectic  $\gamma$  -  $\gamma'$  free. Clearly, Applicants who are experienced metallurgists, who develop alloys day in and day out, would have a better understanding of this than the Examiner. If the Examiner is going to maintain his reliance on this inherency argument, then the Examiner would have to provide a line of technical reasoning to support his position instead of a summary conclusion. This, the Examiner has not done.

With regard to the Examiner's comments in paragraph 5d, one of ordinary skill in the art would be lead to limit the chromium content below 3.0 wt% because those are the only alloys which Erickson fully solutionizes. Assuming arguendo that the Erickson teaches the required heating treatments to fully solutionize the alloy, then the Examiner must accept the full teaching which is that the alloy must have a chromium content of less than 3.0 wt%. In other words, the Examiner can not "cherry pick" the reference to take out the teachings which he deems to be helpful to his position, while ignoring the rest of the teachings in Erickson.

With regard to the Examiner's comments in paragraph 5e, the fact remains that DeLuca does not teach an octet shaped particle. The Examiner merely assumes that DeLuca's particles have the same shape. Such assumption is without merit. Still further, the Examiner not provided any reason why Erickson would be interested in having large particles which are octet shaped.

Finally, the Examiner has not provided any convincing line of reasoning that the products taught by the references would inherently have the same response to fatigue cracks as claimed. The method of making the composition taught by Erickson in view of Kenton and DeLuca et al. is only substantially identical to the method disclosed in the specification. It is the differences between the methods which would lead one to conclude that the products formed by the present invention would have different properties than the products formed by the cited and applied references. It can not be said that the same resistance to initiation and propagation of fatigue cracks as claimed would inherently flow from an admitted different method. Inherency may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient. See *Continental Can Co. v. Monsanto Co.*, 948 F.2d 1264, 1268, 20 USPQ2d 1746, 1749 (Fed. Cir. 1991). The Examiner has provided no explanation as to why the claimed properties must inherently flow from the references.

For the foregoing reasons, the instant application is believed to be in condition for allowance. Such allowance is respectfully solicited.

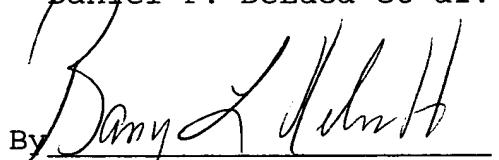
Should the Examiner believe an additional amendment is needed to place the case in condition for allowance, he is hereby invited to contact Applicants' attorney at the telephone number listed below.

No fee is believed to be due as a result of this response. Should the Director determine that an additional fee is due, he is hereby authorized to charge said fee to said Deposit Account.

Respectfully submitted,

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I, Nicole Motzer, hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: "Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313" on December 16, 2005.

